



Active Components Pump Laser Modules

Datasheet RCLIMADSH00000113

Key Features

Up to 540mW Pop

Low Power Consumption

Extended operating temperature range
(-5 °C to +75 °C)

Fiber Bragg Grating (FBG) on SMF

High wavelength and power stability
Telcordia GR-468-CORE qualified
RoHS compliant

Applications

High output power low noise EDFAs

Dense wavelength division multiplexing
EDFAs

CATV

1999CMB

980 nm Cooled Pump Laser Module 594mW Kink-free

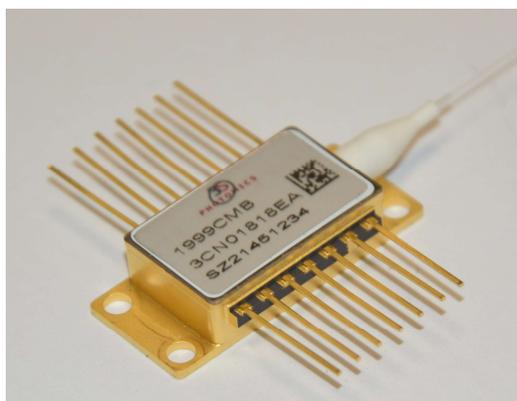
The 1999CMB is a new generation of 980 nm terrestrial pump modules powered by an in-house chip technology fully qualified, ensuring an outstanding level of performance and reliability.

Low Profile, 14-pin butterfly modules are available with an operating power up to 594 mW kink free.

They incorporate a thermoelectric cooler (TEC), a precision NTC thermistor and a back-facet monitoring photodiode.

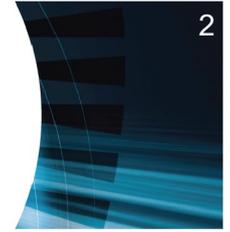
The 1999CMB family has been designed to ensure high wavelength and power stability performance at low power with a 16.5dB dynamic range.

The module meets the Telcordia™ GR-468-Core requirements for hermetic 980 nm pump modules.



For more Info

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ELECTRO-OPTICAL CHARACTERISTICS

The following parameters are specified BOL for a $T_{\text{submount}} = 25\text{ }^{\circ}\text{C}$, $T_{\text{case}} = -5\text{ }^{\circ}\text{C}$ to $75\text{ }^{\circ}\text{C}$, $V_{\text{BFM}} = -5\text{ V}$ and -50 dB max back-reflection unless otherwise stated.

Parameters	Conditions	Symbol	Min	Typ	Max	Unit
PUMP LASER						
Threshold current ⁽¹⁾		I_{th}	-	-	50	mA
Nominal operating power		P_{nom}	150	-	540	mW
Kink free power ⁽²⁾		P_{kink}	$1.1 \times P_{\text{nom}}$	-	-	mW
Forward current ⁽³⁾	$P_{\text{nom}} = 150\text{ mW}$	I_{nom}	-	-	290	mA
	$P_{\text{nom}} = 200\text{ mW}$		-	-	370	
	$P_{\text{nom}} = 250\text{ mW}$		-	-	450	
	$P_{\text{nom}} = 300\text{ mW}$		-	-	520	
	$P_{\text{nom}} = 350\text{ mW}$		-	-	580	
	$P_{\text{nom}} = 360\text{ mW}$		-	-	620	
	$P_{\text{nom}} = 400\text{ mW}$		-	-	680	
	$P_{\text{nom}} = 450\text{ mW}$		-	-	740	
	$P_{\text{nom}} = 460\text{ mW}$		-	-	780	
	$P_{\text{nom}} = 480\text{ mW}$		-	-	820	
$P_{\text{nom}} = 500\text{ mW}$	-	-	860			
$P_{\text{nom}} = 540\text{ mW}$	-	-	870			
Forward voltage	@ 540 mW	V_{nom}	-	-	1.9	V
Center Wavelength		λ_{974}	973	974	975	nm
		λ_{976}	975	976	977	
Peak wavelength tolerance	@ $T_{\text{case}} = T_{\text{FBG}} = 25\text{ }^{\circ}\text{C}$ Power Range	$\Delta\lambda_p$	-	-	± 1	nm
Wavelength tuning vs temperature ($T_{\text{FBG}} = -5$ to $75\text{ }^{\circ}\text{C}$)	Power Range	$\Delta\lambda_p / \Delta T$	-	-	0.02	nm / $^{\circ}\text{C}$
Spectral width @ -3 dB	Power Range	$\Delta\lambda_{\text{FWHM}}$	-	-	1.0	nm
Power range			10	-	P_{nom}	mW
Power in band ⁽⁴⁾	P_{nom}	P_{band}	90	-	-	%
Optical power stability	Peak to peak, 1 Hz-50 kHz, 60 sec, $10\text{ mW} \leq P < 15\text{ mW}$ $15\text{ mW} \leq P \leq P_{\text{nom}}$	ΔP	-	-	0.2	dB
					0.1	
Power consumption, EOL	$T_{\text{case}} = 75\text{ }^{\circ}\text{C}$, $1.1 P_{\text{nom}} = 540\text{ mW}$		-	-	5.2	W
MONITOR DIODE						
Responsivity		I_{BFM} / P	0.5	-	10	$\mu\text{A} / \text{mW}$
Dark current	$V_r = 5\text{ V}$	$I_{\text{BFM_dark}}$	-	-	100	nA
THERMO-ELECTRICAL COOLER						
TEC voltage (EOL)	$T_{\text{case}} = 75\text{ }^{\circ}\text{C}$, $1.1 P_{\text{nom}} = 540\text{ mW}$	$V_{\text{TEC, EOL}}$	-	-	2.7	V
TEC current (EOL)		$I_{\text{TEC, EOL}}$	-	-	1.2	A
TEC Power consumption		$P_{\text{TEC, EOL}}$	-	-	3.2	W
THERMISTOR						
Resistance	$25\text{ }^{\circ}\text{C}$	R_{th}	9.5	-	10.5	k Ω
Constant		β	3600	-	4200	K

(1) I_{th} is the intersection point with the x-axis of a linear fit of the $P(I)$ curve between 15 mW and 50 mW

(2) A kink is detected when the local slope dP/dI is below S_{min} or above S_{max} . S_{min} is defined as $0.5 \times S_{\text{avg}}$ and S_{max} is defined as $1.5 \times S_{\text{avg}}$

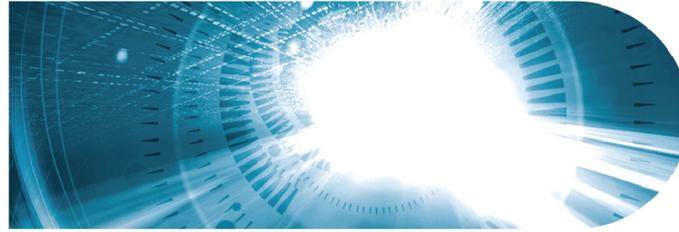
(3) EOL forward current $I(\text{EOL}) = 1.1 \times I(\text{BOL})$

(4) P_{band} is defined as the power within the band $\lambda_p \pm 1.5\text{ nm}$ vs the total output power

1999CMB

605mW Kink-free,
FBG Stabilized,
980 nm Cooled
Pump Laser Module

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ABSOLUTE MAXIMUM RATINGS

Exposing this device to stresses and conditions above those listed in this section could cause permanent damage and affect reliability. The device is not meant to operate outside the operational limits described in previous section at any length of time.

Parameter Conditions	Symbol	Min	Max	Unit
Storage temperature (2000 h)	T_{stg}	-40	85	°C
Operating temperature ($T_{submount} = 25\text{ °C}$) *	T_{op}	-20	75	°C
Lead soldering temperature (10 s maximum)		-	280	°C
Storage Relative Humidity (Non-Condensing)		5	95	%
Operating Relative humidity		5	85	%
LD forward drive current (10 s maximum)	I_{f_max}	-	1000	mA
LD reverse voltage	V_{r_max}	-	2.0	V
PD reverse voltage	V_{PD_max}	-	15	V
PD forward current	I_{PD_max}	-	10	mA
TEC voltage	$V_{TEC_C_max}$	-	4.2	V
TEC current	$I_{TEC_C_max}$	-	2.0	A
ESD** LD damage	V_{ESD-LD}	-	1000	V
ESD** MPD damage	$V_{ESD-MPD}$	-	500	V
Mounting torque		-	150	mN.m
Fiber bend radius		16	-	mm
Axial pull force (1x1 min)		-	5	N

* No cold start. TEC will be turned on first.

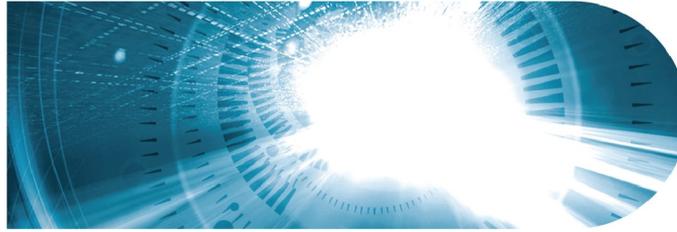
** Human Body model, C = 100 pF, R = 1.5 kΩ

FIBER PIGTAIL CHARACTERISTICS

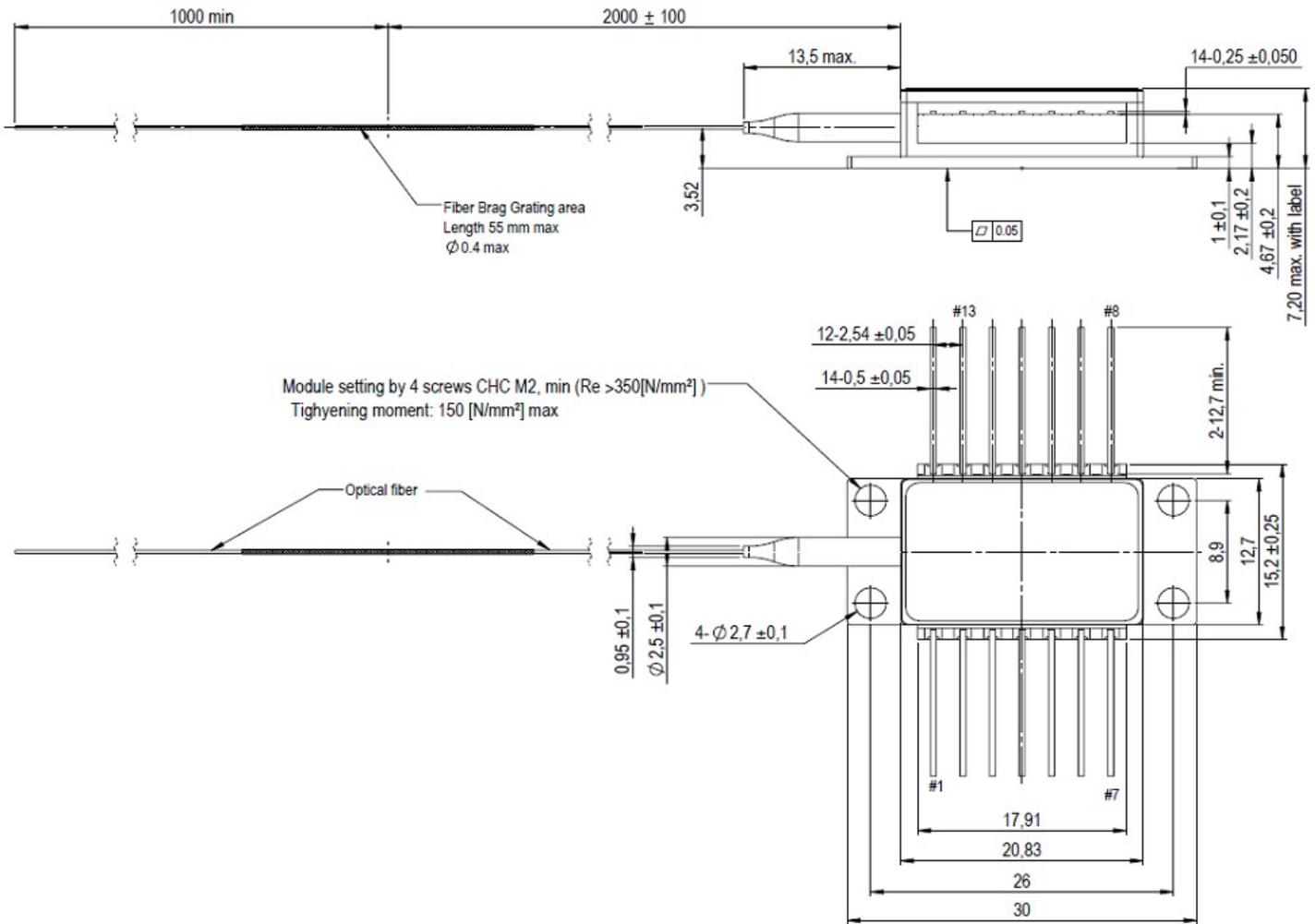
Parameter	Note	Min	Typ	Max	Unit
Fiber type		HI1060™ or equivalent			
Coating diameter	(except along grating)	230	250	270	μm
FBG recoat diameter		-	-	400	μm
FBG position	Module to center of FBG	-	2	-	m
Fiber proof test level		200	-	-	kpsi
Grating proof test level		150	-	-	kpsi
Pigtail termination	Bare fiber				

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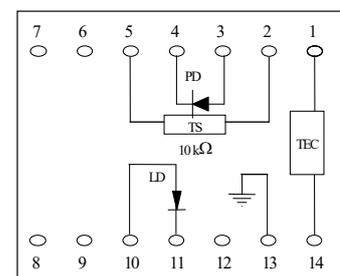
MECHANICAL DETAILS



Dimensions are in mm

PIN ASSIGNMENT

N°	Description	N°	Description
1	TEC (+)	8	No connect
2	Thermistor	9	No connect
3	Monitor PD Anode	10	Laser Anode (+)
4	Monitor PD Cathode	11	Laser Cathode (-)
5	Thermistor	12	No connect
6	No connect	13	Ground
7	No connect	14	TEC (-)



Totally floating pin-out

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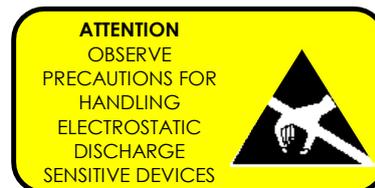
LASER SAFETY INFORMATION

This laser module emits invisible light. Take appropriate precautions to prevent undue exposure to naked eye when module is in operation. This product is classified Class 4 Laser Product according to IEC-60825-1.

HANDLING

This product is sensitive to electrostatic discharge and should not be handled except at a static free workstation. Take precautions to prevent ESD; use wrist straps, grounded work surfaces and recognized anti-static techniques when handling the pump laser module. Caution! Handle the module by its package only; never hold it by its pigtail.

Care should be taken to avoid supply transient currents and voltages. Drive voltage above the maximum specified in absolute maximum rating section may cause permanent damage to the device.



APPLICATION NOTE

In order to prevent any mishandling, misuse, neglect or accident, it is highly recommended to read and follow the instructions detailed in the application note reference "3SPT_980nm Cooled 14_10 pin butterfly module & Raman pump_Application Note_RCLIMAAPN00000007" that can be downloaded from 3SP Technologies website: <http://www.3sptechnologies.com>

ORDERING INFORMATION

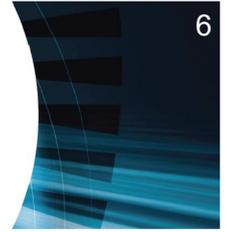
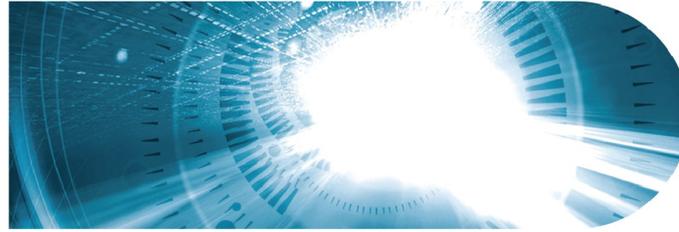
1999CMB PUMP PRODUCT FAMILY

SMF Pigtail	$\lambda_p = 974.0 \text{ nm}$, T= 25 °C	$\lambda_p = 976.0 \text{ nm}$, T= 25 °C
Nominal Power	Part Number	Part Number
150mW	3CN04028AL	3CN04029AL
200mW	3CN04028BA	3CN04029BA
250mW	3CN04028BL	3CN04029BL
300mW	3CN04028CA	3CN04029CA
350mW	3CN04028CL	3CN04029CL
360mW	3CN04028CN	3CN04029CN
400mW	3CN04028DA	3CN04029DA
450mW	3CN04028DL	3CN04029DL
460mW	3CN04028DN	3CN04029DN
480mW	3CN04028DS	3CN04029DS
500mW	3CN04028EA	3CN04029EA
540mW	3CN04028EJ	3CN04029EJ

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